REMARKS

Interview Summary

On December 1, 2010, an Examiner's Interview was conducted between the Examiner, the undersigned attorney, Dr. Marcus Fenton (co-inventor and employee of the assignee) and Dr. Harriet Holden (employee of the assignee). We thank the Examiner for the courtesies extended during the Interview.

During the Interview, Drs. Fenton and Holden showed a specimen and used it to generally show how an apparatus of the invention functions and the nature of the outlets. All claims that are pending and under examination and the documents cited in the pending Office Action – Williams, Tanaka, and Pennamen – were discussed. At the Interview, we discussed with the Examiner how the rejections appeared to misconstrue Tanaka (*e.g.*, the lack of an outwardly tapered nozzle) and Pennamen (*e.g.*, the lack of a description of a nozzle with an exit area to throat area ratio).

In view of the Interview, the Examiner acknowledged that the claims appear to be allowable based on the current art of record, subject to an updated search. (*See, e.g.*, Paper No. 20101201).

Rejections Under §103(a)

A. Claims 52-57, 60-65, 67-70, 72-77, 79-87, and 89

Claims 52-57, 60-65, 67-70, 72-77, 79-87, and 89 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Williams *et al.*, U.S. Patent

No. 5,779,159 ("Williams") in view of Tanaka *et al.*, U.S. Patent No. 5,323,967 ("Tanaka"). (Paper No. 20100715 at 2-8).

Williams discloses a fire fighting nozzle that includes peripheral channeling for an additive fluid. (*See, e.g.*, Abstract; Col. 1, lns. 32-34). The nozzle includes a barrel having an inlet end and a discharge end. "A stem is affixed within the barrel proximate the discharge end. A source of additive fluid is communicated to the barrel. A fluid passageway is defined along wall portions of the barrel, the defined passageway terminating at an outlet proximate the barrel discharge. The additive fluid is communicated to the peripheral passageway. The outlet may [include] an annular outlet or a plurality of outlets." (Col. 1, lns. 59-66).

"In operation, a source of primary fire fighting fluid, such as water or water and foam concentrate or other liquid, is connected to the inlet end and supplied under pressure to the fire fighting nozzle barrel." (Col. 5, lns. 54-57). A source of additive fluid is connected to another opening in the barrel wall. The opening in the wall of the barrel, which is provided as the inlet for the additive fluid connects with a peripheral passageway(s) in the nozzle along the barrel wall. (*See, e.g.*, Col. 5, ln. 54 – Col. 6, ln. 14).

Tanaka discloses a steam injector for, *e.g.*, emergency core cooling systems. (*See, e.g.*, Abstract; Col. 1, lns. 6-10). The steam injector includes: a casing provided with a steam intake port and a water supply port, a steam nozzle disposed inside the casing and in communication with the steam intake port for introducing steam into the casing, a water nozzle disposed inside the casing and

in communication with the water supply port for introducing water into the casing, a steam-water mixing nozzle disposed inside the casing and on a downstream side of the steam nozzle and the water nozzle, a diffuser disposed inside the casing and on a downstream side of the steam-water mixing nozzle, the diffuser being provided with a throat portion, a guide means for unitarily combining the steam nozzle, the water nozzle and the steam-water mixing nozzle to keep constant the relative positional relationships among these nozzles, and a discharge port formed in the casing on a downstream side of the diffuser. (Col. 4, ln. 67 - Col. 5, ln. 18).

In making the rejection, the Examiner asserts that Williams, Figure 1N, discloses "an apparatus for generating a mist". (Paper No. 20100715 at 2). The Examiner further asserts that the Figure 1N apparatus comprises: "a housing (B) having a plurality of interior walls, at least one of the plurality of interior walls defining a passageway (28) along a longitudinal center axis, the passageway having a transport fluid inlet (I), a plenum (PM) adjacent to the transport fluid inlet, a portion (18) adjacent to the plenum, and an outlet (under N); a protrusion (S) with a solid interior located proximate the portion, the protrusion having an outer surface tapered outwardly with respect to the axis; a means for generating a mist substantially of a desired droplet size from a working fluid with a transport fluid, the means including a transport nozzle and a working nozzle, a transport nozzle (O) being defined between: the at least one of the plurality of interior walls tapered outwardly with respect to the axis along the portion, and the outer surface tapered outwardly of the protrusion; the working

nozzle (PO) being defined by other of the plurality of interior walls of the housing, the working nozzle being coincident the transport nozzle so that the working fluid communicated to and exiting the working nozzle and the transport fluid communicated to and exiting the transport nozzle contact for the first time and mix; ... wherein the working nozzle (PO) is defined by a working nozzle outer surface facing inward toward the axis and a working nozzle inner surface facing outward away from the axis; and a working fluid inlet (22) disposed along the housing in communication with the working nozzle." (*Id.* at 2-3). The Examiner acknowledges, however, that Williams does not disclose that "at least one of the plurality of interior walls being continuously tapered outwardly with respect to the axis along the portion ...." (*Id.* at 3, 5, and 8) (internal citations omitted).

To fill the acknowledged gap, the Examiner relies on Tanaka as disclosing an apparatus in which "at least one of the plurality of interior walls (Fig. 18, 110) being continuously tapered outwardly with respect to the axis along the portion ...." (*Id.* at 3). The Examiner then concludes that "it would have been obvious" to modify the nozzle of Williams with the nozzle of Tanaka "to increase the contact area." (*Id.* at 4).

It is well settled that the Examiner bears the burden to set forth a *prima facie* case of unpatentability. *In re Glaug*, 62 USPQ2d 1151, 1152 (Fed. Cir. 2002); *In re Oetiker*, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992); and *In re Piasecki*, 223 USPQ 785, 788 (Fed. Cir. 1984). If the PTO fails to meet its burden, then the applicant is entitled to a patent. *In re Glaug*, 62 USPQ2d at 1152.

One way in which an Examiner's burden is not met is when the Examiner misconstrues a document cited in a rejection. *See, e.g., Ex parte Jones*, 1994 WL 1687158, *1-*2 (B.P.A.I. 1994) (reversing a rejection under §103 because the Examiner misconstrued the primary reference, Cramer) and *Ex parte Ottesen*, 2009 WL 3030307, *6 (B.P.A.I. 2009) (reversing a rejection under §103(a) because the Examiner misconstrued the secondary reference, Law).

It is respectfully submitted that for the reasons set forth below, the Examiner has not met his burden.

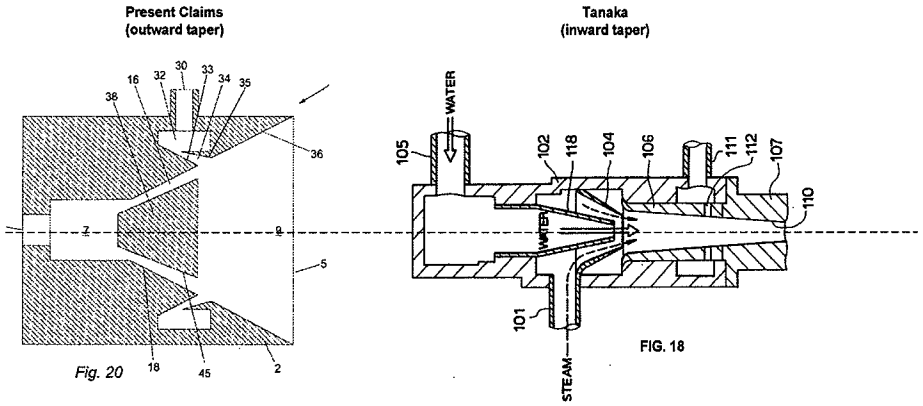
In the rejection of the independent claims, claims 52, 54, and 73, the Examiner conceded that Williams does not disclose interior walls continuously tapered outwardly. (Paper No. 20100715 at 3, 5, and 8). But, the Examiner attempted to fill this acknowledged deficiency with Tanaka:

> However, Tanaka et al. shows wherein at least part of the first outer surface (Fig. 18, 104) converges toward the apparatus axis in a direction toward the first fluid outlet. (*Id.* at 5 and 8).

We respectfully submit that the Examiner has misconstrued Tanaka at least with respect to an apparatus that has at least one of the plurality of interior walls being continuously "tapered outwardly" with respect to the axis as recited in the claims that are pending and under examination in this application.

Contrary to the position taken in the rejection, Tanaka does not disclose at least one of the interior walls being continuously "tapered outwardly" as cited in the claims pending and under examination. Below is a reproduction of Figure 18 of Tanaka (right panel) relied on by the Examiner in a side-by-side

comparison of an embodiment (Figure 20) within the scope of the claims, including claims 52, 54, and 73:



As the Examiner conceded at the Interview, Tanaka clearly discloses the interior walls being tapered inwardly – not "outwardly" as recited in the present claims, including claims 52, 54, and 73 – with respect to the axis. (Paper No. 20101201). And, the rejection previously conceded (*see*, paper no. 20100715 at 3, 5, and 8) that Williams does not disclose interior walls continuously tapered outwardly and thus, cannot remedy this gap in Tanaka. Because of the factual error with respect to Tanaka and because the rejection concedes that there is no disclosure in Williams to remedy this error, the Examiner's legal conclusion of unpatentability based on obviousness must fail. *See, e.g., Ex parte Jones*, 1994 WL 1687158, *1-*2 (B.P.A.I. 1994) and *Ex parte*

Ottesen, 2009 WL 3030307, *6 (B.P.A.I. 2009). Accordingly, the rejection should be withdrawn.

B. Claims 66, 71, 83, and 88

Claims 66, 71, 83, and 88 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Williams *et al.*, U.S. Patent No. 5,779,159 ("Williams") in view of Tanaka *et al.*, U.S. Patent No. 5,323,967 ("Tanaka") and Pennamen *et al.*, U.S. Patent No. 5,810,252 ("Pennamen").

Williams and Tanaka have been summarized previously. (*See*, Sect. A, *supra*). Pennamen discloses methods and apparatus for atomizing a heavy, highly viscous liquid, such as, *e.g.*, an oil, to achieve good combustion of the oil. The Pennamen apparatus "contains a head with a plurality of primary channels, the atomization orifices of which are regularly distributed on the head of the device in the form of a circular ring or in the form of two coaxial circular rings." (Col. 3, lns. 25-30). According to Pennamen, the apparatus is able to achieve atomization of, *e.g.*, oil, into "fine droplets of very small diameter, of the order of 100 thousandths of a millimeter." (Abstract; Col. 1, lns. 25-27). Further according to Pennamen, to obtain droplets of this size, the viscosity of the product must be less than 20 mm^2/s at the atomization temperature. (Col. 1, lns. 27-30).

When Pennamen was filed, for highly viscous liquids, such as oils, with a viscosity of 4,000 mm^2/s at 100°C, the atomization temperature had to be high – between about 200°-230°C – in order to reduce the viscosity of the

product to about 20 mm^2/s to achieve good atomization by conventional methods. (*Id.* at 30-34). Pennamen provides two examples. (Col. 5, ln. 1 – Col. 6, ln. 2). In both examples, Pennamen's apparatus is able to atomize highly viscous liquids, such as oils, at considerably lower temperatures compared to conventional methods. (*Id.*). For the specified conditions, including an oil viscosity of 200 mm^2/s at 20°C, the apparatus was able to atomize the highly viscous fluid into droplets having a Sauter mean diameter at the exit of "35 microns, with 90% of the droplets having a diameter of less than 120 microns and 99% of them having a diameter of less than 290 microns." (Col. 5, lns. 25-28; Col. 5, ln. 66 – Col. 6, ln. 2).

Initially, we note that claims 66, 71, 83, and 88 depend from claims 54 and 73, which claim(s) were rejected over Williams in view of Tanaka in the previous rejection. (*See*, Paper No. 20100715 at 2-8). Thus, we incorporate by reference all of our arguments traversing the previous rejection here. (*See*, Sect. A, *supra*). Accordingly, we respectfully submit that the present rejection of claims 66, 71, 83, and 88 must fail at least for the reasons previously set forth in Sect. A, *supra*.

In this regard, we note that Pennamen does not remedy the deficiency in Tanaka (and Williams) as to the lack of a disclosure of an apparatus that has at least one of the plurality of interior walls being continuously "tapered outwardly" with respect to the axis as recited in the claims that are pending and under examination in this application.

Furthermore, with respect to claims 66 and 83 and as the Examiner conceded at the Interview, the rejection does not – and cannot – identify wherein Pennamen there is disclosed or suggested a nozzle with an "exit area to throat area ratio". At best, as the Examiner acknowledged, the disclosure at col. 2, lns. 61-63 refers to a "tolerance", *i.e.*, the major/minor diameter ratio of the channels. Such tolerances were selected by Pennamen to avoid plugging:

> As indicated above, to suppress or limit the risk of plugging, the primary and the secondary channels preferably should have a minimum transverse dimension of at least 1 mm. The channel diameters are preferably 1 to 8 mm, more preferably 1 to 4 mm and, as shown in the examples below, on the order of 2 mm, being most conveniently circular in cross-section.

(Col. 3, lns. 17-24).

In view of the foregoing, we respectfully submit that the rejection is deficient as a matter of fact and law. *See, e.g., In re Glaug*, 62 USPQ2d at 1152., *Ex parte Jones*, 1994 WL 1687158, *1-*2 (B.P.A.I. 1994) and *Ex parte Ottesen*, 2009 WL 3030307, *6 (B.P.A.I. 2009). Accordingly, for the reasons set forth above, the rejection should be withdrawn.

For the reasons set forth above, withdrawal of the rejections and allowance of the claims is respectfully requested. If the Examiner has any questions regarding this paper, please contact the undersigned.

I hereby certify that this correspondence is being transmitted in accordance with 37 CFR §§1.6(a)(4) and 1.8 via the U.S. Patent and Trademark Office (USPTO) electronic filing system (EFS-Web) to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 21, 2011.

Kevin C. Hooper, Reg. No. 40,402

Respectfully submitted,

By: _____

Kevin C. Hooper
Registration No. 40,402
BRYAN CAVE LLP
1290 Avenue of the Americas
New York, NY 10104-3300
Phone: (212) 541-2000
Fax: (212) 541-4630